ARTICLE APPEARED
ON PAGE 141

READERS DIGEST
October 1985

Using its elaborate worldwide system of photogr[illegible] electronic satellites, surveillance aircraft and ships, and huge on-ground listening stations, the United States has been able to uncover massive Soviet violations of the strategic-arms agreements. But there is much our system cannot see or hear—or even know about—inside the most compulsively secretive society in history. Here, drawn from sensitive sources, is a look at the startling achievements—and grave limitations—of the U.S. high-tech window on the Soviet Union.

U.S. Eyes Over Russia: How Much Can We See?

By Ralph Kinney Bennett

In the Washington Navy Yard, 16 blocks from the Capitol, sits a plain, almost windowless concrete building. Into it come spools of high-resolution photographic film. Days or even hours earlier, these spools were inside capsules hurtling earthward from the threshold of space. High over the Pacific Ocean off Hawaii, the capsules were snatched in midair by planes trailing special wire rigging. After initial processing, the film was brought to this super-secret building, the National Photographic Interpretation Center.

Following a meticulous enhancement process, thousands of feet of film are ready for analysis. Individual pictures may be brought up on computer-console screens, where photo interpreters can zoom in on vivid details—such as two

Ralph Kinney Bennett has covered strategic affairs for Reader's Digest from Washington for the past 17 years. In his May '79 article, "The Fateful Illusions of SALT II," he first raised the matter of hidden Soviet strategic missiles.

Continued

men servicing radar on a "Flogger" all-weather fighter at an air base west of Moscow, or a tractor-trailer parked outside the weapons-grade-plutonium plant at Dodonovo.

The average citizen accustomed to "satellite pictures" on television weather reports would be astounded by the clarity of these close-ups. On a bright day, the make of a car on a Moscow street can be easily distinguished. Some typical overhead "snapshots" from inside Russia:

- At the Black Sea port of Nikolayev, the Soviets are building their first U.S.-style aircraft carrier (present Soviet carriers handle only helicopters or vertical-takeoff aircraft). At the Saki naval airfield, a 975-foot flight deck has been laid out on a runway to train pilots in simulated carrier takeoffs and landings.
- At Uzhur, in southwestern Siberia, lies a Soviet ICBM complex. A blast-door is clearly visible on each of the 64 precisely located silos. Nestled inside every one, we assume, is an SS-18, largest ICBM in the world. Each SS-18 carries 10 to 14 warheads and can be "cold launched"—popped clear of its silo by compressed gas before it fires, thus permitting reloading of the silo. About ten percent of the Soviet arsenal of ICBM warheads is here.
- At Zagorsk, just northeast of Moscow, our space cameras show a heavily guarded complex called the Scientific Research Institute of Sanitation. It is, in fact, a factory and storage area for deadly biological-warfare mycotoxins and related weapons.

High-Tech Sponges. Pictures such as these are mainly the product of our Keyhole (KH) satellites, which circle the globe every hour and a half in north-south polar orbits. Their telephoto lenses can take shots of virtually any point in the world. KH satellites are launched when needed and usually operate four to nine months before running out of film.

The sophisticated, 15-ton, school-bus-size KH-11 satellite can operate indefinitely and send photos back to earth within minutes via its TV-transmission system. Its pictures can reach the White House inside an hour, to reveal a Soviet troop convoy in Afghanistan or a military runway in Nicaragua.

There are currently between 50 and 60 U.S. military satellites aloft. Some are for weather forecasting, navigation and communication relay. The rest are under the direction of an organization so secret its existence is barely acknowledged; its name, the National Reconnaissance Organization (NRO), is simply not acknowledged at all.

The NRO operates its stable of intelligence satellites from the Pentagon's fourth floor. Tiny ferret satellites traveling in very low orbit read radar frequencies. "Elint" satellites intercept a wide variety of electronic emissions that are sorted out by the computer banks of the National Security Agency. Caught in their net is a varied bag of scrambled phone conversations, radio, radar and TV signals, telex and Morse-code messages.

Other satellites that have compromised Soviet secrecy are the Rhyolite series, which, among other things, monitor missile telemetry. In 1973 the first of the Rhyolites were put into orbits that match the earth's rotation so they hover over a fixed point of the globe. One Rhyolite, roughly over Singapore, monitors the Far East; the other, over the Indian Ocean, covers western Russia. These high-tech sponges soak up radio and other signals and beam them back to ground stations.

When any kind of missile is test-fired, it is fitted with tiny telemetry transmitters that send back data on flight performance. Intercepting and analyzing this telemetry enables U.S. intelligence to surmise Soviet missile performance—range, accuracy and number of warheads. Soviet knowledge of Rhyolite and other ferret satellites, gained in espionage coups, may be a reason why in 1974 they began encrypting their telemetry (in violation of the later SALT II treaty), sending back to earth a gibberishlike code that has sorely tried U.S. analysts.

Nonetheless, the electronic cacophony rising from the Soviet landmass provides a torrent of data for the U.S. collection system: specific radar frequencies, telemetry signals and even conversations on car telephones. The system can eavesdrop on Soviet tank crews on maneuvers in the Caucasus and record the dialogue of Soviet fighter pilots such as those who shot down Korean Airlines Flight 007. Here's a glimpse into the secret world of electronic detection, showing how the United States caught the Soviets violating the first SALT treaty.

Cheating Signals. The SALT I-ABM treaty stipulated that neither side would build a nationwide anti-ballistic missile system—or test anti-aircraft radars "in an ABM mode"—that is, to detect incoming missiles. No sooner had the Soviets signed the treaty than they began violating it. In June 1973 U.S. satellites picked up a Soviet radar signal of 6675 megahertz. The signal was recorded six more times that year, but little attention was paid to it. Then, between April 2 and June 21, 1974, the signal showed up again. This time analysts correlated it with the re-entry phase of ballistic-missile flights launched from a secret test facility at Kapustin Yar.

The unique signal was believed to come from Square Pair, an advanced Soviet anti-aircraft radar associated with SA-5 surface-to-air (SAM) missiles. Several Square Pairs had been photographed in the Sary-Shagan missile test corridor. Between April 2, 1974, and February 28, 1975, the signal was ferreted out of the atmosphere more than 30 times in conjunction with a ballistic-missile flight from Kapustin Yar. On three occasions, the signal was "collected" as it bounced off a missile, confirming that the radar signal was focused on the ICBM—a clear SALT violation.

Confronted with the evidence, the Soviets denied testing an anti-aircraft radar as an ABM radar. A few weeks later, the signal ceased. U.S. arms controllers in Geneva, anxious to placate the Soviets, hailed the disappearance of the signal as a "success" of the arms-control process. In fact, as other intelligence confirmed, the Soviets had simply completed their testing.

But a year later, use of Square Pair against missiles resumed, and more sophisticated ABM testing continues. The United States, apparently to preserve the proper arms-control "atmosphere," has suppressed information on it and not effectively challenged the Soviets.

"Range of Uncertainty." Our remarkable technical capabilities have led arms-control devotees to oversell the public on surveillance as our insurance that arms treaties can be "adequately verified." But electronic detective work, done at ranges up to thousands of miles, is often limited and, at best, imperfect.

There are indeed limits to our intelligence collection. Some are physical realities—darkness, clouds, smoke, distance. (During a typical spring and summer in some areas of Russia, only two or three days a month may be cloudless.) Others involve ill-timed satellite passes and Soviet evasive tactics when satellites are overhead. We once had to wait four months to get a certain photograph of Moscow.

The Soviet Union is also dotted with thousands of buildings whose contents and purpose remain unknown. Some experts wonder if a significant number of missiles may be hidden in them. The sheer size of the Soviet landmass creates challenges as well. In recent years several large Soviet military installations were not spotted for months after construction had begun. The most serious example is the ABM radar installation being completed near Krasnoyarsk, a grave violation of the ABM treaty. Construction had been under way for at least 18 months before a tip, apparently from a defector, caused the United States to film it.

Today, moreover, the Soviets are deeply engaged in *Maskirovka,* which Assistant Defense Secretary Richard Perle calls "a vigorous program of deception deliberately leading us to believe that we have seen things that we haven't." Early on, satellites spotted dummy silos at ICBM sites. The Soviets even built fake submarines (a U.S. satellite caught one bent at right angles after a sudden storm at Vladivostok) and dummy SAM installations. The range and vigor of *Maskirovka* seem to grow with each passing month.

The Soviets are also jamming and trying to drown out the electronic sensors of U.S. satellites. In a 1981 incident, the Russians apparently succeeded in switching one of our satellites off with a radio signal. And the Soviets have tried to damage our satellites with laser beams.

They have further sought to deceive us by subtracting warheads and fuel from—or adding them to—missiles so they transmit misleading data on range, speed and other characteristics.

Defense Secretary Caspar Weinberger recently admitted to the Senate that there is a "range of uncertainty" in U.S. assessment of the number of Soviet SS-18 warheads. Though Pentagon estimates of all Soviet ICBM warheads have ranged from 6300 to 8500, David Sullivan, a former CIA and arms-control official, calculates that covert stockpiles—counting re-fires—put the total over 20,000.

Where There's a Will . . . It is also becoming obvious that our technological ability to detect violations has far outrun our will to deal with them. When President Carter was pushing for ratification of SALT II, he assured Congress that, in the face of a significant Soviet violation, "there is no doubt that we would discover it in time to respond fully and effectively."

But the delay in finding such a large installation as the Krasnoyarsk radar makes discovery "in time" a matter of serious doubt. As for responding "fully and effectively," the U.S. record is not good. Henry Kissinger has observed: "Successive Administrations have been reluctant to make a formal charge of violation lest they undermine the domestic support for negotiation and because they did not know what to do about it."

This is the Achilles' heel of the arms-control process. We have devised no punishment for the crime of treaty violation. As the Soviets continue their systematic violations of the SALT treaties, they have observed open warfare in Congress against defense-budget increases and our delay or cancellation of vital new strategic weapons.

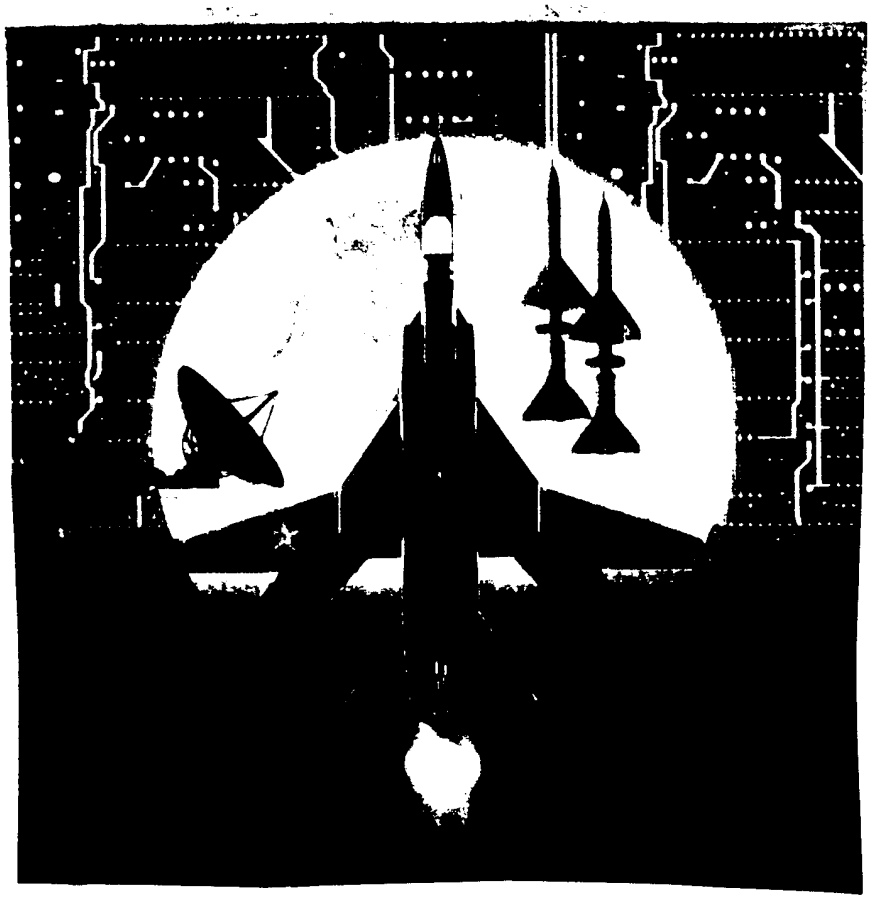
The Administration must explore every avenue of real arms control, but it must as well begin to fashion a decisive policy with enough muscle to *deter* Soviet cheating.

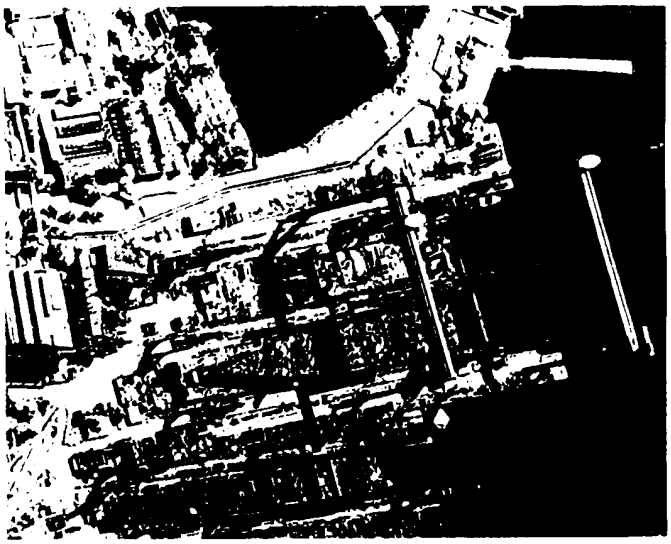
Unless we muster the national will and commit ourselves to the defense programs necessary to offset treaty cheating, we will face the consequences. As Defense Secretary Weinberger warns: "Since the Soviets have suffered practically no penalty for violating their current arms-control commitments, they are unlikely to be deterred from more serious violations in the future."

Continued

4.

ILLUSTRATION BELOW DICK KREPEL BELOW LEFT ARTIST'S CONCEPTION OF A COMMUNICATIONS SATELLITE (BASED ON U S AIR FORCE PHOTO, RELEASED BY DEPT OF DEFENSE)





A computer-enhanced satellite photo of the Soviet navy's first nuclear-powered aircraft carrier, being built in two sections at Nikolayev